

Notice of Allowability

Application No.

09/857,310

Applicant(s)

VAN VAALS, JOHANNES
JACOBUS

Examiner

Tiffany A Fetzner

Art Unit

2859

aw

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/10/2003 with the RCE of 01/26/2004.
2. ☒ The allowed claim(s) is/are 1,3-5,9 and 19-26.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 11/06/04.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>02/23/2004</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. The examiner's Amendment to claim 1, was made to place the steps of the method in a more logical order. No new matter was added. Original specification support for all features is found throughout the original disclose. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with **Robert P. Michal** Reg. No. 35,614 on February 25th 2004.

3. The application has been amended as follows:

A) In the **claims Replace Amended claim 1** of the December 10th 2003 response with the following **Examiner Amended claim 1**, "A method of forming a magnetic resonance image of an object to be examined, comprising the steps of:

inserting a microcoil into the object being examined,

determining the position of the microcoil,

determining a geometrical relationship between the position of the microcoil and the object being examined,

acquiring [a] reference magnetic resonance signals at a reference temperature after the microcoil is inserted into the object being examined,

after the magnetic resonance signals at the reference temperature are obtained, increasing the temperature in an area proximate the microcoil and acquiring measuring magnetic resonance signals after the temperature in the area proximate the microcoil has been increased,

determining a temperature dependent chemical shift upon comparison of the measuring magnetic resonance signals to the reference magnetic resonance signals,

determining a local variation in temperature, in the area proximate the microcoil, on the basis of the temperature dependent chemical shift and the determined position of the microcoil,

~~[determining the position of the microcoil,]~~

~~[determining a geometrical relationship between the position of the microcoil and the object being examined,]~~

reconstructing the magnetic resonance image from the acquired magnetic resonance signals and on the basis of the determined position of the microcoil, the reconstruction step including reconstructing a reference magnetic resonance image from the reference magnetic resonance signals and reconstructing a measuring magnetic resonance image from the measuring magnetic resonance signals,

reproducing a detail of the object being examined and an indication of the position of the microcoil together in the magnetic resonance image, **and**

deriving a correct position of the detail of the object being examined in the magnetic resonance image relative to the indication of the position of the microcoil on the basis of the position of the indication of the position of the microcoil and the determined geometrical relationship between the position of the microcoil and the object being examined.[.]

~~[determining a temperature dependent chemical shift upon comparison of the measuring magnetic resonance signals to the reference magnetic resonance signals,~~

~~determining a local variation in temperature, on the basis of the temperature dependent chemical shift]~~

B) In the Original specification:

B1) On page 3, line 16 **after** "varied" **insert** "(Fig. 3 step 370)".

B2) On page 3, line 23 **after** "measured" **insert** "(Fig. 3 step 380)".

B3) On page 3, line 33 **after** "shift" **insert** "(Fig. 3 step 350)".

B4) On page 7, **after** line 24 **and before** the insertion of correction paragraph A5 of the of the November 6th 2002 amendment, **insert** "Figure 3 shows a flow diagram of a method of forming a magnetic resonance image of an object to be examined, according to the invention with the method steps identified as reference numerals 300, 310, 320, 330, 340, 350, 360, 370, 380, and 390."

C) In the November 6th 2002 amendment response, amended paragraphs:

C1) On page 2, paragraph A2 line 10 **after** "imaged" **Insert** "(Fig. 3 step 320)".

C2) On page 3, paragraph A3 line 4 **after** "detail and the" **Insert** "microcoil / ".

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- C3) On page 3, paragraph A3 line 5 **after** "image" **Insert** "(Fig. 3 step 380)".
- C4) On page 4, paragraph A3 line 1 **after** "derived" **Insert** "(Fig. 3 step 390)".
- C5) On page 4, paragraph A4 line 2 **after** "temperature" **Insert** "(Fig. 3 step 330)".
- C6) On page 4, paragraph A4 line 7 **delete** "reference" and **Insert** "measuring".
- C7) On page 4, paragraph A4 line 8 **after** "temperature" **Insert** "(Fig. 3 step 340)".
- C8) On page 4, paragraph A4 line 12 **after** "signals," **Insert** "(Fig. 3 step 350)".
- C9) On page 4, paragraph A4 line 13 **after** "site" **Insert** "(Fig. 3 step 360)".
- C10) On page 6, paragraph A4 line 3 **after** "patient" **Insert** "(Fig. 3 step 300)".
- C11) On page 6, paragraph A4 line 5 **after** "microcoil" **Insert** "(Fig. 3 step 310)".
- C12) On page 8, paragraph A4 line 1 **after** "measured" **Insert** "(Fig. 3 step 320)".
- C13) On page 11, paragraph A6 line 3 **delete** ", for example,".
- C13) On page 11, paragraph A6 lines 6-7 **delete** ", for example,".

Examiner's Amendment to the Drawings

- 4. The changes to the drawings/specification listed in the examiner amendment above have been approved by the examiner and agreed upon by applicant: A sketch of the examiner approved new figure 3 is attached to this action.
- 5. Applicant must file a New Formal drawing, which corresponds to the new examiner approved figure 3.
- 6. Applicant must also submit a new formal drawing of figure 1 including the changes made in the November 6th 2002 drawing correction submission, which have been approved by the examiner. The easiest way for applicant to comply with the drawing requirements is to file a complete new set of formal drawings for figures 1 through 3 with all of the required and approved changes.
- 7. In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

Examiner's Comment

- 8. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 10th 2003 has been entered.

Canceled Claims

9. With respect to **Claims 10, 11, 12, 18, 27, and 28** these claims are **canceled** as per applicant's December 10th 2003 RCE response.
10. With respect to **claim 2**, this claim is **Cancelled** as per the August 13th 2003 amendment response.
11. With respect to **claims 6-8**, these claims are **Cancelled** as per the August 13th 2003 amendment response.
12. With respect to **claims 13-17**, these claims are **Cancelled** as per the August 13th 2003 amendment response.

Response to Arguments

13. Applicant's arguments with respect to **amended claims 1, 3-5, 9, and 19-26** have been considered and are persuasive as a result the **Kucharczyk et al.**, reference US patent 6,061,587 issued May 9th 2000, filed May 15th 1997, is no longer considered to be prior art against the currently amended claims of the instant application. [See specifically applicant's arguments on the December 10th 2003 response concerning the **Kucharczyk et al.**, reference, page 14 paragraph 2 through page 16.] The examiner is persuaded by applicant's arguments, that the instant application is distinct from the prior art of **Kucharczyk et al.**

14. The following is an examiner's statement of **Reasons for Allowance**:
15. With respect to **Examiner Amended method claim 1**, "A method of forming a magnetic resonance image of an object to be examined, comprising the steps of:
inserting a microcoil into the object being examined,
determining the position of the microcoil,

determining a geometrical relationship between the position of the microcoil and the object being examined,

acquiring reference magnetic resonance signals at a reference temperature after the microcoil is inserted into the object being examined,

after the magnetic resonance signals at the reference temperature are obtained, **increasing the temperature in an area proximate the microcoil and acquiring measuring magnetic resonance signals after the temperature in the area proximate the microcoil has been increased,**

determining a temperature dependent chemical shift upon comparison of the measuring magnetic resonance signals to the reference magnetic resonance signals,

determining a local variation in temperature, in the area proximate the microcoil, on the basis of the temperature dependent chemical shift, and the determined position of the microcoil,

reconstructing the magnetic resonance image from the acquired magnetic resonance signals and on the basis of the determined position of the microcoil, the reconstruction step including reconstructing a reference magnetic resonance image from the reference magnetic resonance signals and reconstructing a measuring magnetic resonance image from the measuring magnetic resonance signals,

reproducing a detail of the object being examined and an indication of the position of the microcoil together in the magnetic resonance image, and

deriving a correct position of the detail of the object being examined in the magnetic resonance image relative to the indication of the position of the microcoil on the basis of the position of the indication of the position of the microcoil and the determined geometrical relationship between the position of the microcoil and the object being examined."

16. This amended claim is considered to be allowable over the **prior art of record** because this claim contains limitations that when taken in combination with one another

are combinationally novel and non-obvious. It is the entire series of steps as outlined in Figure 3 of applicant's specification that is the combinational feature of novelty in applicant's examiner **amended independent claim 1**, and it is these features taken in combination with one another which distinguishes applicant's application from the prior art.

17. The prior arts of **Kucharczyk et al.**, **Rasche et al.**, **Gillies et al.**, **Truwit et al.**, **Darrow et al.**, and **Schneider et al.**, do not teach, suggest, or show the entire combination of all of applicant's claimed limitations either singularly or in combination with one another. It would not have been obvious to one of ordinary skill in the art, at the time that the invention was made to perform each of the method steps as required by applicant because the prior art fails to teach or suggest determining a temperature dependent chemical shift from a comparison of two sets of magnetic resonance signals obtained before and after a temperature change of an NMR microcoil." {See applicant's arguments of the December 10th 2003 amendment response page 15 last paragraph] **in combination with each of the other features** as set forth in applicant's **amended claim 1**. Applicant's combination of features within **amended claim 1** teaches away from what is known in the art, and is therefore considered to be both novel and nonobvious by the examiner.

18. With respect to **amended dependent claims 3**, and **19-23**, these amended claims are considered to be allowable over the prior art of record because they depend from allowable **examiner amended claim 1**.

19. With respect to previously presented **dependent claims 4, 5, 9**, and **24-26**, these claims are considered to be allowable over the prior art of record because they also depend from allowable **examiner amended claim 1**.

20. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Prior Art made of Record

21. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

A) Kucharczyk et al., US patent 6,061,587 issued May 9th 2000, filed May 15th 1997.

B) Kucharczyk et al., US patent 6,026,316 issued February 15th 2000, filed May 15th 1997 which is similar to the 6,061,587 patent applied above and the examiner notes that each of the **Kucharczyk et al.**, 6,061,587 and **Kucharczyk et al.**, 6,026,316 patent are subject to a terminal disclaimer.

C) Gillies et al., US patent 6,272,370 B1 issued August 7th 2001, filed August 7th 1998 which teaches and shows an MR visible medical device that uses microcoils, to image a patients' internal anatomy.

D) Truwit et al., US patent 5,964,705 issued October 12th 1999 which shows an MR compatible medical device that uses microcoils.

E) Darrow et al., US patent 5,730,129 issued March 24th 1998.

F) Schneider et al., US patent 5,711,300 issued January 27th 1998.

G) Rasche et al., US patent 5,938,599 issued August 17th 1999.

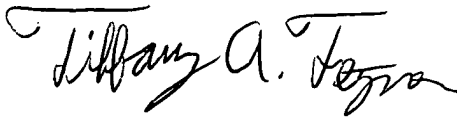
H) Kucharczyk et al., US patent 6,626,902 issued September 30th 2003, filed April 12th 2000. The examiner notes that this reference while having been considered is not prior art against the application because applicant's application has a priority date of October 1st 1999.

Conclusion

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

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23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.



TAF

March 3, 2004



Diego Gutierrez

Supervisory Patent Examiner

Technology Center 2800